

PATENT ABSTRACTS OF JAPAN

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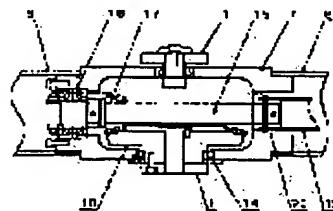
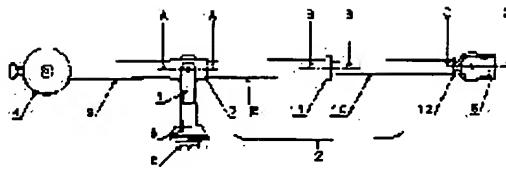
(22) Date of filing : 29.08.1994 (72) Inventor : TAN KUNIAKI

(54) CAMERA CRANE

(57) Abstract:

PURPOSE: To eliminate such danger as to get a hand caught at the time of the up-down operation of an arm by installing a rotary shaft along the arm, and engaging bevel gears, provided at both ends of the rotary shaft, respectively with bevel gears provided at a support and a camera fitting part to control the attitude of the camera fitting part.

CONSTITUTION: An arm 2 pivotally supported to a support 1 is fitted with a camera fitting part 3 at the tip, and a balance weight 4 at the rear end. Inside the arm 2 of hollow cylindrical structure, a rotary shaft is installed along the arm 2. One of large bevel gears 18 engaged with small bevel gears 17 fitted to both ends of the rotary shaft is fixed to the support 1, and the other is fixed to the camera fitting part 3 pivotally fixed to the tip of the arm 2. The attitude control of the camera fitting part 3 is performed by the rotary shaft enclosed in the arm 2 and the bevel gears 17, 18 at both ends. There is thereby no such danger as to get a hand caught by the up-down operation of the arm 2 while enabling compactness and light weight as a camera crane.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention carries a television camera etc., is the camera crane which can set the camera station (height) as arbitration, makes the arm supported pivotably especially to the stanchion incline forward and backward, and relates to the camera crane which installed the camera fitting at the tip of an arm.

[0002]

[Description of the Prior Art] Since it is carried on the universal head installed in the camera fitting, a camera fitting needs to be the posture always same regardless of the forward-and-backward inclination angle of an arm, and a television camera etc. is **. The conventional camera crane has the common structure shown in drawing 6. namely, -- Attitude control of a camera fitting is performed by forming the parallel bar 102 in parallel with an arm 101, forming a parallelogram link by the stanchion 103 and the camera fitting 104, and always making parallel the link equivalent section of a camera fitting 104 with the link equivalent section of a stanchion 103. In addition, in 105, a universal head and 106 show a camera and 107 shows a counter weight.

[0003] Moreover, the camera crane shown in drawing 7 is also put in practical use partly. That is, it is fixing to a stanchion 103. A pulley 108 and the pulley 109 of the diameter of said are pivoted at the tip of an arm, and a camera fitting 104 is fixed to this pulley 109. If a pulley 108,109 is connected by the chain or the belt 110 with a gear tooth, this will bring about the same effect as the parallel bar 102 of drawing 6. The arm 101 of drawing 7 is a cartridge in the air, and has structure which contains a pulley 108,109 and a chain, or a belt 110 in it.

[0004]

[Problem(s) to be Solved by the Invention] if the forward-and-backward inclination angle of an arm is enlarged by the parallelogram link as shown in drawing 6 -- the gap of an arm 101 and the parallel bar 102 -- narrow -- becoming -- just -- being alike -- since interference is caused, in producing a limit on a forward-and-backward inclination square, or performing forward-and-backward inclination actuation, applying a hand to an arm, it produces the danger of pinching a hand. For this reason, the arm 101 and the parallel bar 102 needed to open a certain degree gap, and have barred the miniaturization of a crane. It is same for the path of a pulley 108,109 to need a certain amount of magnitude, and to become the trouble of a miniaturization also with the structure of drawing 7.

[0005] When a camera crane is carried or stored, since an arm is a long picture, inconvenience is produced in many cases. For this reason, an arm is shortened or divided at the time of conveyance and storing, and assembling and long-picture-izing at the time of use is performed. however -- the structure of drawing 6 and drawing 7 -- decomposition and assembly -- time amount and time and effort -- needing -- moreover -- The adjustment for the attitude control of a camera fitting is needed for long picture-ization after assembly.

[0006]

[Problem(s) to be Solved by the Invention] Along with an arm, the axis of rotation is installed in the arm

of tubed structure in the air, one side of the large umbrella gear which engages with the small bevel gear attached in the both ends is fixed to a stanchion, and it fixes to the camera fitting which pivoted another side at the tip of an arm. An arm is made into elastic structure with the minor diameter pipe inserted in a major-diameter pipe, and with a pipe, the round bar inserted in this, and spline fitting, the axis of rotation is elastic and is made into the structure of transmitting rotation.

[0007]

[Function] Since the same, then the large umbrella gear by the side of a stanchion do not rotate to a stanchion the gear ratio of the bevel gear engaged by the stanchion side, and the gear ratio of the bevel gear engaged by the camera fitting side by immobilization The large umbrella gear which fixed to the camera fitting does not rotate relatively, either, therefore, in a camera fitting, the forward-and-backward inclination angle of an arm keeps the same posture unrelated. Moreover, since rotation of the axis of rotation is transmitted as it is even if it expands and contracts an arm and the axis of rotation, the posture of a camera fitting is also maintained as it is.

[0008]

[Example] The details of this invention are explained about an example. Drawing 1 shows the camera crane based on this invention. In drawing 2 , AA view cross section of drawing 1 and drawing 3 show BB view cross section of drawing 1 , and drawing 4 shows CC view cross section of drawing 1 . The camera mount 3 is attached at a tip, it attaches a counter weight 4 in the back end, and the arm 2 supported pivotably by the stanchion 1 constitutes the camera crane. A stanchion 1 is installed on the rotation pedestal 5, and forward-and-backward inclination and revolution of AMU 2 are performed. In addition, 6 is the fixing metal for installing a camera crane on a tripod or the stand of a movable cart.

[0009] An arm 2 consists of the arm pars intermedia material 7 and a pipe-like camera side arm 8, a weight side arm 9, and a slide arm 10 of a minor diameter, and a slide arm 10 is inserted into the camera side arm 8, and is fixed by the clamp 11. In addition, the tip metallic ornaments 12 for supporting the camera mount 3 pivotably are being fixed at the tip of a slide arm 10.

[0010] As details are shown in drawing 2 , the arm pars intermedia material 7 is supported pivotably by the stanchion 1 by bearing 13 and 14, and is supporting the pivotable support shaft and the shaft 15 which intersects perpendicularly by bearing 16. It is engaging with the large umbrella gear 18 which the small bevel gear 17 were fixed to the shaft 15, and was fixed to the stanchion 1. The end of a shaft 15 is combined with the tubular axis of rotation 19 which has penetrated the interior of the camera side arm 8 by the pin 20.

[0011] As shown in drawing 3 , a clamp 11 is screwed with the screw section at the tip of the camera side arm 8, binds tight the external surface of the slide arm 10 inserted in the interior of an arm 8 with a taper-like skid coma 21, and is fixed. Under the present circumstances, the key seat 23 of the external surface of a key 22 and an arm 10 established in the inside of an arm 8 is made to fit in as a baffle of a slide arm 10. In addition, an arm 10 escapes from 24 and it is a stopper ring for stops. The tubular axis of rotation 19 which has penetrated the interior of the camera side arm 8 inserts in the interior the back end section of the axis of rotation 25 which has penetrated the interior of a slide arm 10, makes the key 26 attached at the tip of the tubular transfer shaft 19, and the key seat 27 prepared in the shaft 25 fit into it, is elastic and forms the axis of rotation which transmits rotation.

[0012] At the tip of a slide arm 10, as shown in drawing 4 , the shaft 29 which the tip metallic ornaments 12 were fixed and was fixed to the camera mount 3 and the large umbrella gear 28 is supported by bearing 30. Moreover, the base of the tip metallic ornaments 12 is supporting the axis of rotation 25 which has penetrated the interior of a slide arm 10 by bearing 31, attaches the small bevel gear 32 at the tip of the axis of rotation 25, and is made to engage with said large umbrella gear 28. The axis of a shaft 29 and the axis of the axis of rotation 25 lie at right angles, and the shaft 29 of the camera mount 3 becomes the pivotable support shaft of the arm pars intermedia material 7, i.e., the forward-and-backward inclination shaft of an arm 2, and parallel as a result.

[0013] Let the large umbrella gears 18 and 28 and the small bevel gear 17 and 32 which mesh with this be the respectively same numbers of teeth. Since the large umbrella gear 18 does not rotate by immobilization to a stanchion 1, the large umbrella gear 28 does not rotate him relatively to 18

regardless of the forward-and-backward inclination angle of an arm 2. That is, the posture of the camera mount 3 is always fixed. Therefore, the beginning If the optical axis of the camera of loading is horizontally taken to the camera mount 3, however the height of a camera may change with forward-and-backward inclination of an arm 2 A camera optical axis always maintains a horizontal. Moreover, even if it operates a clamp 11 and sets a slide arm 10 as which location, the above-mentioned function does not change. However, the weight or the attaching position of a counter weight 4 needs to be adjusted by the length of an arm.

[0014] Another example is indicated to be the above to drawing 5 . The arm unit 51 consists of a tubed arm 52, the axis of rotation 53 which penetrates the interior of an arm 52, and bearing 54 which supports a shaft 53. The axes of rotation are the axial fittings 55, tubed arms combine two or more arm units 51 with the pipe fitting 52, and a long arm is formed. If the arm unit by the side of a stanchion is shown in drawing 2 , it will be combined with the same arm pars intermedia material 7 and the same shaft 15, and the arm unit by the side of a camera mount will be combined with the shaft of the same tip metallic ornaments 12 as drawing 4 , and the small bevel gear 32. With this structure, at the time of conveyance and storing, it can decompose for every arm unit, and can convey and contain, and the camera crane which has a long arm easily can be assembled only by using axial fitting and pipe fitting at the time of use.

[0015]

[Effect of the Invention] Since the axis of rotation contained in the arm and the bevel gear of the both ends were made to perform attitude control of a camera fitting, the danger that a hand is pinched by forward-and-backward inclination actuation of an arm disappears, and small lightweight-ization of it as a camera crane is attained. Moreover, an arm and the axis of rotation are made into elastic structure, or it becomes easy to make it easily connectable structure, and it enables this to shorten or divide an arm at the time of conveyance and storing.

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EFFECT OF THE INVENTION

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OPERATION

[Function] Since the same, then the large umbrella gear by the side of a stanchion do not rotate to a stanchion the gear ratio of the bevel gear engaged by the stanchion side, and the gear ratio of the bevel gear engaged by the camera fitting side by immobilization The large umbrella gear which fixed to the camera fitting does not rotate relatively, either, therefore, in a camera fitting, the forward-and-backward inclination angle of an arm keeps the same posture unrelated. Moreover, since rotation of the axis of rotation is transmitted as it is even if it expands and contracts an arm and the axis of rotation, the posture of a camera fitting is also maintained as it is.

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EXAMPLE

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the front view of the camera crane by this invention.

[Drawing 2] It is AA view cross section of drawing 1.

[Drawing 3] It is BB view cross section of drawing 1.

[Drawing 4] It is CC view cross section of drawing 1.

[Drawing 5] It is based on this invention. It is the front view of the camera crane of another example.

[Drawing 6] It is the front view of the conventional camera crane.

[Drawing 7] Former It is the front view of another camera crane.

[Description of Notations]

1 Stanchion

2 Arm

3 Camera Mount

4 Counter Weight

7 Arm Pars Intermedia Material

8 Camera Side Arm

10 Slide Arm

11 Clamp

12 Tip Metallic Ornaments

17.32 smallness bevel gear

18.28 large-umbrella gear

19 Tubular Axis of Rotation

25 Axis of Rotation

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CLAIMS

[Claim(s)]

[Claim 1] A camera crane characterized by making an arm supported pivotably to a stanchion incline forward and backward, being the camera crane which pivoted a camera fitting at a tip of an arm, installing the axis of rotation along with an arm, making it engage with a rotation transfer device in which a rotation transfer device prepared in the both ends was prepared in a stanchion and a camera fitting, respectively, and performing attitude control of a camera fitting.

[Claim 2] A camera crane according to claim 1 characterized by said rotation transfer devices being bevel gear.

[Claim 3] A camera crane according to claim 2 characterized by a posture of a camera fitting becoming fixed [a forward-and-backward inclination angle of an arm] unrelated always by fixing to a stanchion bevel gear formed in a forward-and-backward inclination shaft of an arm.

[Claim 4] An arm is formed by the tubed structure in the air, and is characterized by containing said axis of rotation to the interior. Claims 1 and 2, a camera crane of three publications.

[Claim 5] It is the camera crane according to claim 4 which an arm fits in elastically, forms the hollow tubed structure of two size, and is characterized by being the combination structure of two shafts of the axis of rotation being elastic and transmitting rotation.

[Claim 6] It is the camera crane according to claim 4 which a single arm is the tubed structure of hollow which supported the axis of rotation by bearing inside, and is characterized by for the axis of rotation being axial fitting about two or more single arms, and being pipe fitting, joining together, respectively and the tubed structure forming a long arm.

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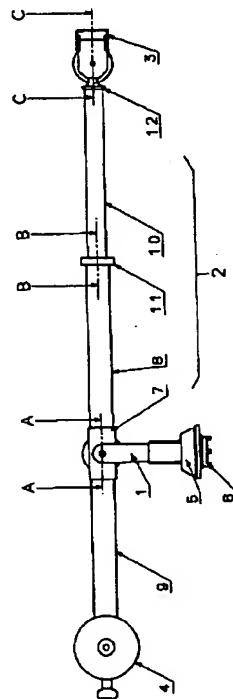
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(54)【発明の名称】 カメラクレーン

(57)【要約】

【目的】 アームの俯仰操作時 手を挟むような危険性を排除して、且つ、小型軽量化が可能となり、また、運搬格納時にはアームを短縮できるカメラクレーンを提供する。

【構成】 中空の筒状構造のアーム内に、アームに沿って回転軸を設置し、その両端に取付けた小傘歯車と係する大傘歯車の一方を支柱に固定し、他方をアーム先端に枢着したカメラ取付部に固定する。アームは大径管で挿入した小径管で伸縮自在な構造とし、回転軸は管とこれに挿入する丸棒とスプライン接手によって伸縮自在で回転を伝達する構造とする。



【特許請求の範囲】

【請求項1】 支柱に枢支したアームを俯仰させ、アームの先端にカメラ取付部を枢着したカメラクレーンであって、アームに沿って回転軸を設置し、その両端に設けた回転伝達機構を、それぞれ支柱およびカメラ取付部に設けた回転伝達機構と係合させて、カメラ取付部の姿勢制御を行うことを特徴とするカメラクレーン。

【請求項2】 前記回転伝達機構が傘歯車であることを特徴とする請求項1記載のカメラクレーン。

【請求項3】 アームの俯仰軸に設けた傘歯車を支柱に固定することによって、カメラ取付部の姿勢が、アームの俯仰角とは無関係に常に一定となることを特徴とする請求項2記載のカメラクレーン。

【請求項4】 アームが中空の筒状構造体で形成され、その内部に前記回転軸を収納することを特徴とする請求項1、2、3記載のカメラクレーン。

【請求項5】 アームは大小2個の中空筒状構造体を伸縮自在に嵌合して形成し、回転軸は伸縮自在で回転を伝達する2本の軸の組合せ構造であることを特徴とする請求項4記載のカメラクレーン。

【請求項6】 単一のアームは内部に回転軸を軸受で支承した中空の筒状構造体であって、複数の单一アームを回転軸は軸接手で、筒状構造体は管接手で、それぞれ結合して、長尺のアームを形成することを特徴とする請求項4記載のカメラクレーン。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明はテレビカメラなどを搭載し、その撮影位置（高さ）を任意に設定できるカメラクレーンであって、特に支柱に枢支したアームを俯仰させ、アーム先端にカメラ取付部を設置したカメラクレーンに関するものである。

【0002】

【従来の技術】テレビカメラなどは、カメラ取付部に設置した雲台上に搭載されるので、カメラ取付部はアームの俯仰角の如何にかかわらず常に同じ姿勢であることが必要である。従来のカメラクレーンは図6に示す構造が一般的である。即ち、アーム101と平行に平行バー102を設け、支柱103及びカメラ取付部104とで平行四辺形リンクを形成し、カメラ取付部104のリンク相当部を常に支柱103のリンク相当部と平行にすることによって、カメラ取付部の姿勢制御を行っている。なお、105は雲台、106はカメラ、107は平衡重錠を示す。

【0003】また、図7に示すカメラクレーンも一部で実用化している。即ち、支柱103に固定しているブーリ108と同径のブーリ109をアーム先端に枢着し、このブーリ109にカメラ取付部104を固定する。ブーリ108、109をチェーン又は歯付ベルト110で連結すれば、これは図6の平行バー102と同じ

効果をもたらす。図7のアーム101は中空の筒形で、ブーリ108、109およびチェーン又はベルト110をその中に収納する構造となっている。

【0004】

【発明が解決しようとする課題】図6に示すような平行四辺形リンクでは、アームの俯仰角を大きくするとアーム101と平行バー102との間隔が狭くなり、ついには干渉を起すので、俯仰角に制限を生じたり、アームに手をかけて俯仰操作を行う場合には、手を挟む危険性を生じる。このためアーム101と平行バー102とはある程度間隔をあける必要があり、クレーンの小型化を妨げている。図7の構造でもブーリ108、109の径はある程度の大きさを必要とし、小形化の支障となることは同様である。

【0005】カメラクレーンを運搬あるいは格納するとき、アームが長尺であるため不便を生じることが多い。このため運搬・格納時にはアームを短縮あるいは分割し、使用時に組立てて長尺化することが行われている。しかし図6、図7の構造では分解、組立に時間と手間を必要とし、また長尺化に組立後、カメラ取付部の姿勢制御のための調整が必要となる。

【0006】

【発明が解決しようとする課題】中空の筒状構造のアーム内にアームに沿って回転軸を設置し、その両端に取付けた小傘歯車と係合する大傘歯車の一方を支柱に固定し、他方をアーム先端に枢着したカメラ取付部に固定する。アームは大径管に挿入した小径管で伸縮自在な構造とし、回転軸は管とこれに挿入する丸棒とスプライン接手によって伸縮自在で回転を伝達する構造とする。

【0007】

【作用】支柱側で係合する傘歯車の歯数比と、カメラ取付部側で係合する傘歯車の歯数比を同一とすれば、支柱側の大傘歯車は支柱に固定で回転しないので、カメラ取付部に固定した大傘歯車も相対的には回転せず、従ってカメラ取付部はアームの俯仰角とは無関係に同じ姿勢を保つ。また、アームおよび回転軸を伸縮しても、回転軸の回転はそのまま伝達されるので、カメラ取付部の姿勢もそのまま維持される。

【0008】

【実施例】本発明の詳細を実施例について説明する。図1は本発明にもとづくカメラクレーンを示す。図2は図1のAA矢視断面図、図3は図1のBB矢視断面図、図4は図1のCC矢視断面図を示す。支柱1に枢支されたアーム2は先端にカメラ取付台3、後端に平衡重錠4を取付けてカメラクレーンを構成している。支柱1は回転基台5の上に設置され、アーム2の俯仰と旋回が行われる。なお6はカメラクレーンを三脚上に、または移動台車の架台上に設置するための取付金具である。

【0009】アーム2はアーム中間部材7、および管状のカメラ側アーム8、重錠側アーム9、小径の伸縮アーム

ム10で構成され、伸縮アーム10はカメラ側アーム8の中に挿入されて締付金具11によって固定される。なお、伸縮アーム10の先端にはカメラ取付台3を枢支するための先端金具12が固定されている。

【0010】アーム中間部材7は、図2に詳細を示すように、軸受13、14で支柱1に枢支され、その枢支軸と直交する軸15を軸受16で支承している。軸15には小傘歯車17が固定され、支柱1に固定された大傘歯車18と係合している。軸15の一端は、カメラ側アーム8の内部を貫通している管状回転軸19にピン20で結合されている。

【0011】図3に示すように、締付金具11はカメラ側アーム8の先端のネジ部と螺合して、アーム8の内部に挿入された伸縮アーム10の外面をテーパ状のすべりコマ21で締付けて固定する。この際伸縮アーム10の回り止めとして、アーム8の内面に設けたキー22とアーム10の外面のキー溝23とを嵌合させている。なお、24はアーム10の抜け止め用のストッパー輪である。カメラ側アーム8の内部を貫通している管状回転軸19は、その内部に、伸縮アーム10の内部を貫通している回転軸25の後端部を挿入し、管状伝達軸19の先端に取付けたキー26と軸25に設けたキー溝27とを嵌合させて、伸縮自在で回転を伝達する回転軸を形成している。

【0012】伸縮アーム10の先端には、図4に示すように、先端金具12が固定され、カメラ取付台3および大傘歯車28に固定された軸29を軸受30で支承している。また、先端金具12の基部は、伸縮アーム10の内部を貫通している回転軸25を軸受31で支承しており、回転軸25の先端には小傘歯車32を取付けて前記大傘歯車28と係合させている。軸29の軸線と回転軸25の軸線とは直交しており、結果としてカメラ取付台3の軸29は、アーム中間部材7の枢支軸、即ちアーム2の俯仰軸と平行になる。

【0013】大傘歯車18と28、およびこれと噛み合う小傘歯車17と32は、それぞれ同じ歯数とする。大傘歯車18は支柱1に固定で回転しないで、アーム2の俯仰角の如何にかかわらず大傘歯車28は、18に対して相対的に回転しない。即ち、カメラ取付台3の姿勢は常に一定である。従って当初 カメラ取付台3に搭載のカメラの光軸を水平にとれば、アーム2の俯仰によりカメラの高さがどのように変化しても カメラ光軸は常に水平を維持する。また、締付金具11を操作して伸縮アーム10をどの位置に設定しても上記の機能は変わらない。ただし、アームの長さによって平衡重錘4の重量または、取付位置は調節が必要である。

【0014】上記とは別の実施例を図5に示す。アームユニット51は筒状アーム52と、アーム52の内部を貫通する回転軸53と、軸53を支承する軸受54とで構成される。複数のアームユニット51を回転軸同士は軸接55で、筒状アーム同士は管接56で結合して長尺のアームを形成する。支柱側のアームユニットは図2に示すと同様のアーム中間部材7および軸15と結合され、カメラ取付台側のアームユニットは図4と同様の先端金具12および小傘歯車32の軸と結合される。この構造で運搬、格納時には各アームユニットごとに分解して搬送、収納し、使用時は、軸接手と管接手を用いるだけで容易に長尺のアームをもつカメラクレーンを組立てることができる。

【0015】

【発明の効果】カメラ取付部の姿勢制御をアーム内に収納した回転軸とその両端の傘歯車とで行うようにしたので、アームの俯仰操作で手を挟むような危険性はなくなり、カメラクレーンとしての小型軽量化が可能となる。また、アームおよび回転軸を伸縮自在の構造にしたり、簡単に接続できる構造にすることが容易となり、これにより運搬、格納時アームを短縮あるいは分割することが可能となる。

【図面の簡単な説明】

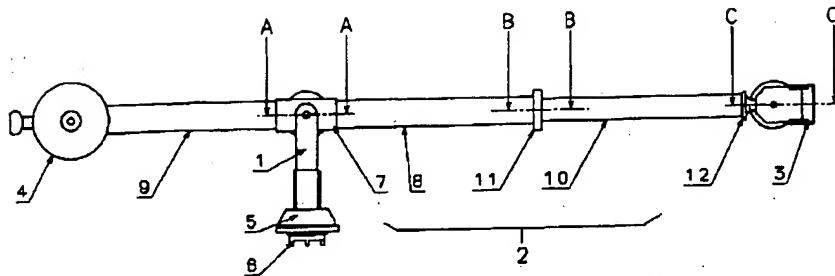
【図1】本発明によるカメラクレーンの正面図である。
【図2】図1のAA矢視断面図である。
【図3】図1のBB矢視断面図である。
【図4】図1のCC矢視断面図である。
【図5】本発明による別の実施例のカメラクレーンの正面図である。

30 【図6】従来のカメラクレーンの正面図である。
【図7】従来の別のカメラクレーンの正面図である。

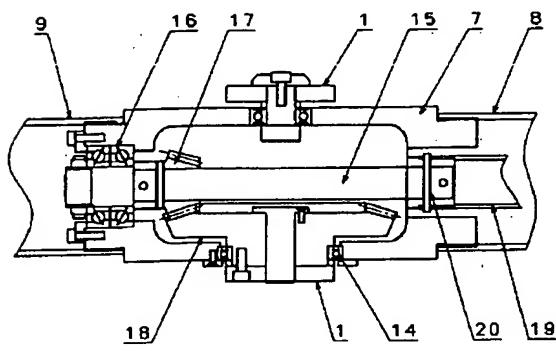
【符号の説明】

- 1 支柱
- 2 アーム
- 3 カメラ取付台
- 4 平衡重錘
- 7 アーム中間部材
- 8 カメラ側アーム
- 10 伸縮アーム
- 40 11 締付金具
- 12 先端金具
- 17. 32 小傘歯車
- 18. 28 大傘歯車
- 19 管状回転軸
- 25 回転軸

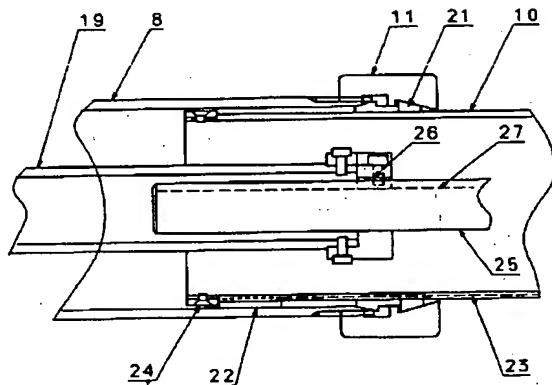
【図1】



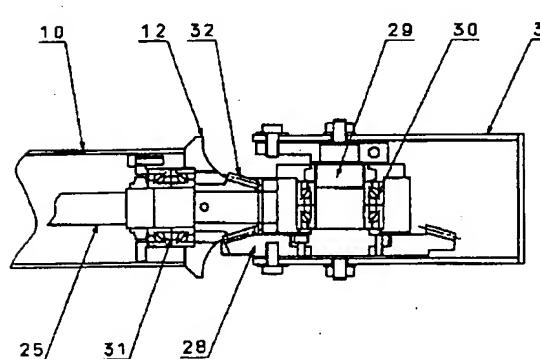
【図2】



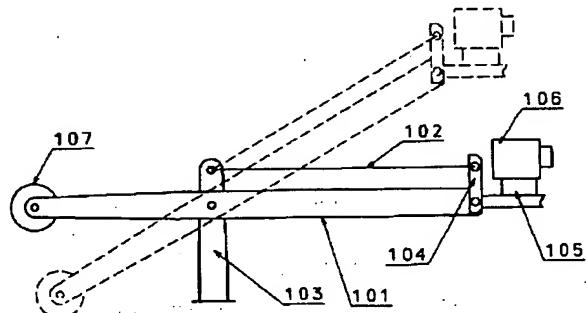
【図3】



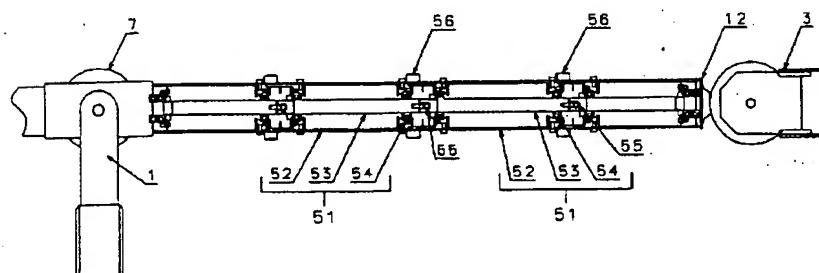
【図4】



【図6】



【図5】



【図7】

